

ART 34 AMBT

Claims

1. Process for controlling the integrity of planar substrates, such as sheets of paper, characterised by the following steps:
 -) providing a first trigger (2) at a selected first location along the direction of displacement of the substrate for detecting the passage of an edge (6; 7) of the substrate at said first location;
 -) providing a second trigger (5) at a selected second location after said first trigger (2) along the direction of displacement of the substrate for detecting the passage of an edge (6; 7) of the substrate at said second location;
 -) providing at least a first checkpoint detector (3) at a selected third location between said first and second triggers (2, 5) along the direction of displacement of the substrate, said at least first checkpoint detector (3) being adapted to detect the passage of said edge (6; 7) of the substrate at a selected place along said edge (6; 7) which is different than the place at which said first and second triggers (2, 5) are adapted to detect the passage of said edge (6; 7);
 -) detecting the passage of said edge (6; 7) of the substrate at said selected locations by means of said first trigger (2), said at least first checkpoint detector (3) and said second trigger (5);
 -) controlling whether the passage of said edge (6; 7) of the substrate was detected by said at least first checkpoint detector (3) after detection by said first trigger (2) and before detection by said second trigger (5); and
 -) generating an integrity check failed message in case the passage of said edge (6; 7) of the substrate was not detected by said at least first checkpoint detector (3) after detection by said first trigger (2) and before detection by said second trigger (5).
2. A process as claimed in claim 1, wherein two or more checkpoint detectors (3, 4) are provided at selected locations between said first and second triggers (2, 5) along the direction of displacement of the substrate, each of said checkpoint detectors (3, 4) being adapted to detect the passage of said edge (6; 7) of the substrate at selected places along said edge (6; 7) which are different that the place at which said first and second triggers (2, 5) are adapted to detect the passage of said edge (6; 7).

ART 34 AMDT

3. A process as claimed in claim 2, wherein the integrity check failed message is generated in case the passage of said edge (6; 7) of the substrate was not detected by one of said checkpoint detectors (3, 4) after detection by said first trigger (2) and before detection by said second trigger (5).
4. A process as claimed in claim 2 or 3, wherein two checkpoint detectors (3, 4) are located close to the corners of said substrate.
5. A process as claimed in one of the preceding claims, wherein said edge is the leading edge (6) and/or the trailing edge (7) of the substrate.
6. A process as claimed in one of the preceding claims, wherein said detection is made by optical means.
7. A control device for controlling the integrity of planar substrates, such as sheets of papers, said device being characterised in that it comprises :
 -) a first trigger (2) arranged at a selected first location along the direction of displacement of the substrate for detecting the passage of an edge (6; 7) of the substrate at said first location;
 -) a second trigger (5) arranged at a selected second location after said first trigger (2) along the direction of displacement of the substrate for detecting the passage of an edge (6; 7) of the substrate at said second location;
 -) at least a first checkpoint detector (3; 4) arranged at a selected third location between said first and second triggers (2, 5) along the direction of displacement of the substrate, said at least first checkpoint detector (3; 4) being adapted to detect the passage of said edge (6; 7) of the substrate at a selected place along said edge (6; 7) which is different than the place at which said first and second triggers (2, 5) are adapted to detect the passage of said edge (6; 7); and
 -) a computer element (14) adapted to control whether the passage of said edge (6; 7) of the substrate was detected by said at least first checkpoint detector (3; 4) after detection by said first trigger (2) and before detection by said second trigger (5).

ART 34 ANDT

8. A control device as claimed in claim 7, characterised in that it further comprises another checkpoint detector (4) arranged at a selected fourth location between said first and second triggers (2, 5) along the direction of displacement of a substrate (1) and which is adapted to detect the passage of said edge (6,7) at another place along said edge (6; 7).
9. A control device as claimed in claims 7 or 8, characterised in that said triggers (2, 5) and checkpoint detectors (3,4) are optical detectors.
10. A control device as claimed in one of claims 7 to 9, characterised in that said triggers (2, 5) and checkpoint detectors (3,4) comprise light emitting diodes.
11. A machine characterised by at least one control device according to one of claims 7 to 10.